

Sample Pages

"We need stories by the fire—essays, poems, art, fiction, all of it—to help guide and inspire us."
—Chris Turner, Author of *How to Be a Climate Optimist*

REIMAGINING



the Future of Energy

Eveline Kolijn, Editor

Foreword by Chris Turner

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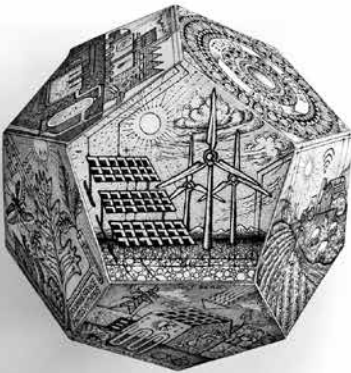
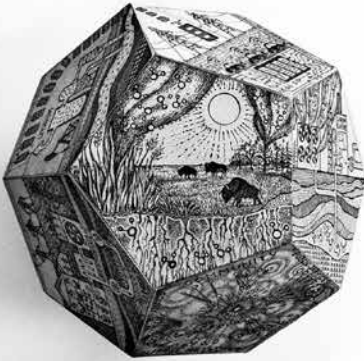
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Transition Prisms, Eveline Kolijn. Etchings, constructed into prisms.
Artist's statement is at the end of Chapter 16.

FOREWORD

Chris Turner

ALL THE BASIC NECESSITIES of life revolve around energy. Acquiring it, harnessing it, using it to cook food or boil water or warm a dwelling against the cold. Fire is the original energy source, the first one that human populations could control, distribute, increase or decrease as needed. And fire remains central to the production of energy, and to the metaphorical lens we use to understand our relationship with energy.

Most of the world's transport is driven by contained explosions—passenger jets soaring across oceans do so on ribbons of fire, and so does the family car for most of us—and much of the world's electricity is produced by boiling water through one method or another to spin turbines, a sort of refinement on fire's ancient role in our lives. Fire, in many senses, remains our primary energy source.

Fire is also the engine of the stories we tell. Stories are a kind of food—the soul's most vital food, I'd wager, after love—and we first fed each other in this way, gathered around campfires, huddled against the night, its cold and its cloaked dangers, telling stories to explain our place on the land and in the universe. Telling stories to explain what makes us human, what makes us families and clans and tribes. Fires on the savannah, fires in a simple home's hearth, fires in the furnaces of generations of homes, the fires in the electronic hearth of the TV or computer screen. What makes us human—what makes us singularly so, what unites us as a species apart from all the others—more than our quest for fire and our insatiable need to share our stories, gathered in one sense or another around a fire?

Fire comes at a cost. We've only just begun to tally up how great that cost truly is, but we have discovered with grim certainty that

fire's life-giving and life-fulfilling gifts have come at a dire price. The burning of fires in the industrial age—the big ones, the furnaces of industrial scale and power, fuelled mainly by oil and coal and natural gas—have amassed into an existential threat to humanity's very survival. "The fires have leapt from their furnaces"—this is how Richard Harrison puts it in his poem "And It Bursts With Light," one of many bracing pieces that wrestle with our complicated relationship with fire and its proxies in the pages that follow. The climate crisis, born of two blazing centuries, is now upon us. Some scientists—the ones tasked with naming and defining geological time—suggest this is in fact a new epoch, wrought by human hands. Wrought, more precisely, by the monumental fires human hands have lit and fed. They call it the Anthropocene—the time made by *Anthropos*, by people. It might just as well be called the *Pyrocene*, the time made by fire.

The vital task of this troubling new epoch is to radically reconfigure our relationship with energy—with fire and everything else. Energy transitions of such magnitude have historically happened across centuries, even millennia, as human societies have slowly developed and adapted to new technologies based on new energy sources. This time, we are transitioning deliberately, as fast as possible, to a global energy system that is free of the greenhouse gas emissions driving the climate crisis—a global energy system free of fire, or at least free of fire's choking smoke. Over the past two decades, as the scope of the climate crisis has become clear, a toolkit has been hastily assembled to accomplish this task. (It might not seem so hasty, not as the daily news fills with reports of disaster, but we are in fact moving very, very fast.) But human societies do not make these transitions on the strength of tools alone—especially not at the speed the crisis obliges.

We need stories by the fire—essays, poems, art, fiction, all of it—to help guide and inspire us. There is a line widely attributed to Antoine de Saint-Exupéry that goes like this: "If you want to build a ship, don't drum up the men to gather wood, divide the work and give orders. Instead, teach them to yearn for the vast and endless sea." Like so many quotes these days that become memes, it appears

not to come directly from the French author's work—it's a paraphrase, refined into a kind of slogan. But it's no less worthwhile for the uncertainty of its origins. It speaks to a deep truth—we are not persuaded to dramatic action or substantial change or great works of collective resolve by our tools, nor by their technical details. Not by the data they generate, not by the concentration of carbon dioxide in parts per million graphed in an accusatory line gone almost straight upward, not even by the cost per kilowatt-hour of solar power in a line gone nearly identically straight downward. Numbers don't move us to yearning for vast seas. Stories do.

The energy transition now underway needs more stories. We need narratives of escape, survival, salvage, even (maybe especially) triumph. Some of these narratives are gathered here. Many more have yet to be written, painted, sculpted.

I've spent twenty years charting the first searching chapters of this energy transition, and I've been convinced beyond doubt it is, at its core, an optimistic tale. It is perilous but thrilling, a story not of mere survival but of great opportunity. It is about building a better world. If we succeed—and I believe we will, even though there will be great loss still to come along the path—it will be a story of collaboration and cooperation on a scale and with a speed never before seen in human history. And it is already underway, and it is accelerating. We have already begun to reimagine fire.

Chris Turner, foreword writer, is an award-winning author and one of Canada's leading writers and speakers on climate change solutions and the global energy transition. His latest book is How To Be A Climate Optimist, a survey of the first two decades of progress on solving the climate crisis. His previous books on climate, energy and technology include The Patch (winner of the National Business Book Award), The Leap and The Geography of Hope, and his essay and feature writing have received 10 National Magazine Awards.



Mendeleyev's Dream, Mary Kavanagh. Photograph (Sky detail);
watercolour on paper (Periodic Table of the Elements).
Artist's statement is at the end of Chapter 6.

INTRODUCTION

Eveline Kolijn

Origins: Fire and the Sun

FIRE IS AN ELEMENTAL POWER. It burns and destroys, but also protects and nurtures. Fire was our first source of energy and has fueled many inventions. Anthropologist Lévi-Strauss postulated that fire is the foundation of human culture—the difference between the raw and the cooked. Firelight enabled prehistoric humans to create their first marks and images on the walls of deep dark caves, the origins of the images and stories that contain the power to transmit knowledge and culture over space and time. A Greek myth tells us that fire is a gift to humanity from the titan Prometheus, who in some stories was also our creator, forming the first people out of clay. Things made of clay need to be touched by fire to keep their shape, but fire cannot ignite without something to burn, and for millions of years, that something was plant life, wood.

Trees came into being because 3.5 billion years ago, early cyanobacteria harnessed sunlight to turn water and carbon dioxide into oxygen and the sugars they needed for food. This revolutionary process, called photosynthesis, created the possibility for these microscopic single-celled algae to be absorbed into plants as chloroplasts and evolve into larger and more numerous plant species. With their emergence, plants were able to sustain animal life, so ultimately, almost all life on our planet is powered by the sun.

Photosynthesis was so successful that these tiny blue-green algae changed the earth's atmosphere with the 'waste' from its chemical reaction—oxygen. Over approximately four hundred million years these innumerable cyanobacteria flourished, increasing the amount of oxygen in the atmosphere from practically nothing to our current 21 percent. Though it was slow-moving, it was the

first climate crisis, as life had to adapt to its own corrosive waste, those higher concentrations of oxygen in the atmosphere.

Fast forward to the Devonian and Carboniferous eras between 350 and 150 million years ago, when giant forests and swamps covered the planet. What is now the province of Alberta, Canada was at that time a shallow, tropical sea, filled with photosynthetic algae and coral. In tandem with the forests that covered the land, they removed huge amounts of carbon dioxide from the atmosphere and the oxygen increased even more to an all-time high of 35 percent. This increase changed the climate again, and the earth cooled. The masses of dead trees and plants from those forests, swamps, and coral reefs were buried, sequestering that carbon taken from the atmosphere in deep geological layers of the earth. Over time, this organic biomass fossilized and transformed into natural gas, coal, and oil.

The Rise of Carbon Democracies

When wood burns, its fibres and minerals react with oxygen, and the carbon bound in its organic material gets released back into the atmosphere as carbon dioxide. The energy from the sun that went into growing the wood is released again, as heat, light, and ash.

Before the industrial revolution, most heat used for all sorts of processes was derived from wood or natural burnable material that needed sun power to grow. In his book *Carbon Democracy*, Timothy Mitchell argues that the timescale of energy and food production was dependent on the rate of photosynthesis in crops, the lifespan of animals, and the time needed to replenish stands of timber and grazing lands. This physical relationship with photosynthesis set certain limits to the socio-energetic metabolism of any society. A society seeking to increase its energy use could only do so by expanding available land use, and one way this was achieved was by colonizing more territory.

This all changed when humans obtained access to fossil fuels, first coal, then oil. Once we started burning fossil fuels at

a large scale, humanity gained access to the energy from sunshine that had been buried over millions and millions of years. Since the industrial revolution in the mid-eighteenth century, we cracked open a cache of energy that had been accumulated over a massive amount of time and territory. That this could disturb “the harmony of the world” was already predicted by Eugène Huzar in 1857.

Coal was the primary fuel used in the steam-powered industry and petroleum was exclusively used for illumination. Electrification of streetlamps at the beginning of the 20th century made the use of oil redundant for lighting, so this was, according to Mitchell, a primary driver for switching to using oil for mechanical power, at first, to heat the water for steam-engine boilers and later in internal combustion engines, designed to run exclusively on oil. The internationalization of oil happened in even more recent history, after the termination of the second world war. The post-war US aid programs, which were designed to make Europe economically healthy as soon as possible, pushed Europe to change from coal to oil. Mitchell expertly analyses how this switch set our 20th-century democracies on track to becoming ‘carbon democracies’ together with a new macro-economic concept of calculating and managing the circulation of money tied to the movement of oil, now well-known as ‘the economy.’

This new social-energetic metabolism decoupled the dependence of population centres on their immediate territory for energy provision. Thus, the stage was set for immense technological innovation in tandem with explosive population growth. This event is often called ‘the great acceleration’. Could we view it this way: all this massively released energy has ultimately been converted into population mass? If so, the question becomes what happens when this population mass releases the sequestered carbon that was accumulated over 300 million years back into the atmosphere in just one big belch of only 300 years?

Climate Change

Change is a given in the evolution of our planet, and its biosphere operates within the envelope of the earth's system. To name our planet's living system, scientists refer to Greek mythology again: they call it Gaia, after the primordial goddess of Earth, mother of all life.

Gaia has gone through many eras of climatic change. Like the blue-green algae from archaic times, we are a hugely successful 'infestation' species, but we are ravishing the available resources on our planet and creating more waste than the ecosystem can handle.

What is happening now is unprecedented. There is a conundrum at the heart of the discussion surrounding climate change: in geological terms, this change is happening at warp speed. On a human scale, it is happening at a rate that is too slow to be alarming to many people. Climate change is a prime example of what Rob Nixon presents in his book, *Slow Violence and the Environmentalism of the Poor*: "By slow violence I mean a violence that occurs gradually and out of sight, a violence of destruction that is dispersed across time and space, an attritional violence that is typically not viewed as violence at all."

Climate change became a household term only recently, but scientists had been aware for some time that burning fuels could pose a problem, if not a threat. Early mentions of the issue include deforestation and air pollution from smoke in London, England, in writings from John Evelyn (1620-1706). In 1896, Svante Arrhenius was the first to calculate that fossil fuel combustion could eventually result in global warming. Concerns grew, and by 1988 the Intergovernmental Panel on Climate Change (IPCC) was established to prepare regular comprehensive reviews and recommendations concerning the state of knowledge of the science of climate change.

Here is what we know: Earth's average temperature will increase through the accumulation of trapped heat caused by an increased amount of carbon dioxide, methane, and nitrous oxide

in the atmosphere, released through human action. That is why they have the collective name of greenhouse gases. The rise of average global temperature will have many effects: the permanent ice mass on the planet will continue to melt faster than it freezes, so sea levels will keep rising, flooding coastal population centres and small islands. The temperature change affects air and ocean circulation patterns, thereby causing tempestuous and massively destructive weather events: hurricanes, floods, droughts, and wildfires. The cascading effects will be disruptive to plant and animal life and to our ability to grow food. These changes will displace an even more massive number of people than they already have. The UN estimates 20 million people a year are displaced by climate change, resulting in a total of 1.2 billion by 2050. Uche Umezurike delves into environmental migration with his story “Fireflies” in this volume. These are only the main examples. There are many, many more subtle feedback effects that scientists are studying, and those insights are continuously updated, so our picture of this complex climate change system is constantly shifting. But one urgent conclusion remains unaffected: it is going to be a massive problem for humanity and if we don’t immediately curb our output of greenhouse gases, we can reach a threshold at which the planet will no longer be able to sustain human life.

Time for Action

Here is what we also know: we must reduce our fossil fuel consumption. In our search for solutions, we immediately bump into multiple related issues which demonstrate we are dealing with a wickedly complex problem. One obvious solution points to making our technologies less carbon-intensive, by adapting existing technologies and inventing new ones. Finding alternative solutions has already been in motion for several decades and we are at a fortunate crossroads, where many renewable technologies have become viable options. Maggie Hanna has done an excellent job in outlining these solutions in, “How can the future go really, really well?” the last essay of this book.

The Russian invasion of Ukraine in 2022 is a shocking reminder that we haven't put the politics of empire and colony behind us and are causing another wave of human suffering as well as massive shortages of gas inflicted on Europe for its support of Ukraine. The world is collectively holding its breath, watching an accelerating development of renewables, and wondering what its outcome is going to be. It is a race to free us all from the very dependency on non-renewables that fed colonial thinking and led to climate change.

However, we need more than a technofix. We also must deal with pollution, depletion of natural resources and destruction of ecosystems. They are equally complex problems intertwined with climate change. Reducing our consumption is a necessity. We must move to a circular system where the 'waste' of one process becomes a resource for another. We can deconsume by buying less and using products that last a long time or are easy to repair. This is a sensible and productive course of action, with a much longer history than our current practices.

Further, as Natalie Meisner and Jacqueline Huskisson point out in their combination of incisive poetry and visual imagery titled "Clingwrap," we need to disabuse ourselves of the planetarily destructive absurdity of the idea that we need to package ourselves—and everything else—in plastic, or manufacture products with planned obsolescence to live a prosperous and hygienic life.

A flaw in our current economic model is to exempt its impact on nature as an 'externality'. This dematerializes the economy and creates the impression limitless growth is possible. The paradigm of limitless accumulation needs to be revoked because this thinking threatens to break the physical limits of our earth system. The loss of biodiversity on our planet over just the past 25 years is shocking. We are part of the web of life and by violating it, we violate ourselves. For example, insect populations are declining at such a rate it affects the pollination of our plants and food crops! Global action is shaping up after a Conference of

the Parties to the UN Convention on Biological Diversity, called COP15, in Montreal in December 2022. The world has finally decided that a united effort for global conservation has the highest priority, and an agreement to protect at least 30 percent of our planet, has been reached. Many details are to be fleshed out, but a target to reduce the use of pesticides by half in 2030 has been set. One of the contributors to this book, Alice Major, was invited to come and read from her “Welcome to the Anthropocene” at the COP15 conference as part of programming at the Canada Pavilion. She was part of a panel discussion on the challenge of communicating science to non-scientists—a challenge that is also central to our project in this volume.

Oil is connected to extractivist thinking in which nature exists purely as a resource to be exploited. Indeed, being independent of nature is seen as the ultimate expression of freedom. We need to change that thinking to a more holistic worldview. Anthropologist Wade Davis is a great advocate to remind us that there are many different worldviews in existence, and that our dominant, industrial view in which non-human forces and systems have no place isn't the only possible one. For many Indigenous cultures, the land is alive, it is a sacred geography, and nature is animated. Different values and respect for the web of life nurture lifestyles that are more reciprocal and generative with the natural world. It is time to listen and learn from these non-exploitative, non-industrial cultures.

The planet's resources are being consumed at an unsustainable rate, but not evenly across the globe. We have a huge issue of equity in this debate. For example, the affluent cultures in Europe, North America, and Australia have the most carbon-intensive lifestyle and impact per capita. However, in Asia, human impact on climate change rests with numbers. A modest increase in the standard of living results in a carbon footprint amplified by the sheer size of its population. The acceleration in global consumption is highly unequal, and most humans continue to be denied their basic needs. People who struggle to survive, and

there are many, don't have the luxury to worry about reducing their footprint. This inequality exists everywhere. Indigenous Peoples have been seeking social justice in demanding reconciliation with Canada's damaging settler, colonizing past. Involving Indigenous Peoples as equal partners and recognizing their right to free and prior informed consent in decisions regarding land rights and resource extraction are important components in tackling domestic climate justice.

But what we need is more than thought. In his poem, "A Foot Each in Two Canoes," Michael Leeb makes us feel the necessity of recognizing the connection between climate change and decolonizing our relationship with the Indigenous population of Canada. And in "Challenging Times," the bi-racial Kainai artist Jared Tailfeathers and ecologist Larry Kapustka connect six principles related to energy futures with six Blackfoot words or concepts and the traditional knowledge embedded into them. In this combination of sestina and essay, European and Indigenous views acknowledge a shared love for Gaia, Earth, and Turtle Island.

The Journey to Re-imagining Fire and Energy Futures

My childhood was steeped in oil and white privilege. Monica Kidd, Mark Hopkins, and others in this book also refer to growing up with the comfort of new inventions, while at the same time enjoying a world that was not yet as heavily degraded or polluted as ours has become. Ironically, the international lifestyle of my father's oil career exposed me to remote places, where I learned to love unspoiled parts of nature. These experiences have been foundational to me. Currently, I live and work in Calgary, Alberta, Canada. Looking back and reflecting on the necessity to change, I aim to create connections in my practice between art, science, biodiversity, social activism, and climate change.

This path has led to my Fellowship with the Energy Futures Lab (EFL) in 2018. The non-profit Lab is based in Alberta and consists of 40 to 60 Fellows and support staff. They are a network of innovators and influencers with diverse views and come

from government and communities, the energy sector, First Nations, non-profits, academia, and the arts. The EFL supports change-makers as they collaboratively explore the following question: How can we leverage Canada's assets and innovation capacity to accelerate an inclusive and equitable transition to a prosperous net-zero future?

Alberta embodies a microcosm of issues that are encountered worldwide in the energy transition debate. Alberta, with most of its wealth derived from oil and gas, is steeped in today's still-dominant petro-culture. This relationship with fossil fuels creates resistance to change. However, being an oil and gas-producing region also means that there are many people already trained in working with energy technologies, making the transition into new jobs relatively easy. Alberta has a large Indigenous population with its own proud cultures, histories, and worldviews, struggling for general reconciliation with their colonized past and securing their place in a transitioning world. The province still has relatively wide tracts of wilderness. Alberta has a lot of potential for developing renewable energy, as it is rich in sun, wind, and geothermal heat. The province is rich in lithium brine which can be extracted from existing wells but has an issue with cleaning up old oil and gas infrastructure and toxic tailings from the oilsands. Though differently proportioned, these are challenges and opportunities encountered all over the globe, which makes the Alberta story a global story.

Combining my experience as a visual artist and a Fellow, I invited submissions from 40 Alberta printmakers, writers, and poets. I connected this diverse group, ranging from emerging to veteran artists and authors, through a series of networking sessions with Fellows from the EFL. Next, artists and writers were paired, and everyone participated in informational group sessions with the Fellows-experts, to learn about energy transition and be inspired. This project is completely Alberta-based. The resulting text and images are published as an original fine-art print portfolio in tandem with this book publication.

The book is intended to be visionary. Many people struggle with forming an idea of our future. Providing a vision through an artistic lens can inspire, empower, and feed action. The public is aware of the debate on climate change and the need for the energy transition. The uncertainty that follows from heading into new pathways with cultural changes has created a deeply divided debate on the direction of the transition. Many voices in this debate are from experts in industry, scientists, and policymakers. Visual images and literature can translate the technical talk of science into the emotional domain of public discourse. Artists cannot provide definitive answers or solutions, but they can envision, clarify, question, and experiment with the entangled narratives of the energy transition. This narrative involves change over a long timeline, which can also be bridged in storytelling. Stories and poems can rouse public sentiment in a way that scientific facts cannot.

The artists and writers were free to choose their subject matter, and it was enriching for me, as curator and editor, to reap fantastic results. Many go back to basics: the priority of protecting our natural environment and the necessity of having access to clean air, the soil of the earth, and water. Elements of nature. Mary Kavanagh has created a reflection of our complex atmosphere with lyrical simplicity: what is in the sky, and what is this materiality that we, and the whole world, are made of? Richard Harrison and Rosemary Griebel have written odes to the soil: Richard critiquing its sometimes-despised role in history, Rosemary, herself a gardener, explores our intimacy with it and the hope in regenerative farming. Carole Bondaroff depicts the constancy found in traditional and modern windmills, while Mar'ce Merrell invites a group of experts around a campfire to share their stories of water alongside the visual image of artist Liz Ingram's hands, which are holding water like prayer. In Tara Manyfingers' image of a colonized Narcissus gazing into a pool, we have a glimpse of how we should adore the clean water itself rather than our own reflection and our exploitative desires. In Emma Gammans' story, an

impoverished couple illegally gathers firewood to keep warm. Kate Baillies and Katie Bruce pulled prints from physical matter: soil, grass, or a crack in the wall. Kasia Koralewska boiled natural fibres to make dye. The clouds and rocks in Jill Ho-You's cyanotype have a more menacing nature, as does the coal mining depicted by Alex Thompson.

The contributions to this book are incredibly honest. The authors openly share how they are wrestling with the complexities of our time and the fact that there are no easy answers. Alexis Kienlen and Kathryn Lennon muse on this when writing on energy poverty and growing your food. The supporting images by Heather Urness and Hannah Gelderman are playful linocuts and screen-prints. Times of crisis are times of doubt for all, and readers will notice that supporters of the energy transition feel uncertainty too. The main character in Donna Williams' story wonders if her husband should switch to working in "the new nuclear"? And while many authors decry the damaging pollution resulting from oil extraction, they acknowledge they are also part of its culture. Jessica Semenoff depicts damaged fish in the Athabasca River. Poet Shannon Kernaghan feels 'slippery' between environmental criticism and her partner's work in oil and gas. Environmental care is often placed in opposition to a hypermasculine culture connected with the oil patch, indicating that a cultural shift needs to happen as an essential ingredient of energy transition. Peter Midgley tells an apocalyptic, surrealist story featuring an environmental pestilence with a connection to our recent pandemic. The story was triggered by the image of his paired artist, Stan Phelps.

Another strong theme in this book is hope. Alice Major, Kim Mannix, Maggie Hanna, and Barbara Howard all have hope for the future. In Alice Major's work, the earth we learned to break open is the lid of the Pandora's box of fossil fuels, but there is also hope left in the box and the earth, such as the green resource of geothermal heat. Sylvia Arthur has depicted it as a human pipeline, while Jamie-Lee Girodat shows the bowels of the earth as a mass of wriggling arms full of potential action. We need mindful action

sustained by empathy, exercised on many levels. We need action from industry, regulation and stimulus from levels of government and awareness at a community and individual level, all with a willingness to support and make the changes that are possible in their sphere. Nadia Perna and I reflect on these many interlocking elements of transition; either like a patchwork blanket or facets constructed into a prism. Barbara tells a great epistolary story set in the future in which much has changed, but many things are still ordinarily the same. Her story is tinged with nostalgia, which is another theme that creeps into many contributions. In urging us to recognize we have a choice, Mark Hopkins explores two future scenarios: one which works out well, and one that doesn't. Even the dark story by Uche Peter Umezurike finds hope. He writes about a child-climate refugee, who invents a solution for the future. What is more hopeful than youth and imagination? There is always the possibility of an unexpected invention. Recent reports on fundamental breakthroughs in nuclear fusion are optimistic sparks for the future.

Hope, imagination, and action. Can they re-imagine fire not as the energy created by an Earth diminished by consumption, but as the feeding power of the wind and waves and the sun and the soil and the earth beneath? To re-imagine fire as Gaia's child and re-imagine our inventions as good for all living things, not just us. What we are transitioning to is not just a different way of doing old things, but moving from despair, dogmatism, and inactivity to hope, imagination, and action. To imagine is to dream in practical terms. And, as Chris Turner reminds us in his foreword and his recent book, *How to be a Climate Optimist*, the progress of new technologies is accelerating, to make our world not only sustainable but to make it even better. So, too, must our political and social will to use them.

—Bears paw, December 2022

Recommended Reading

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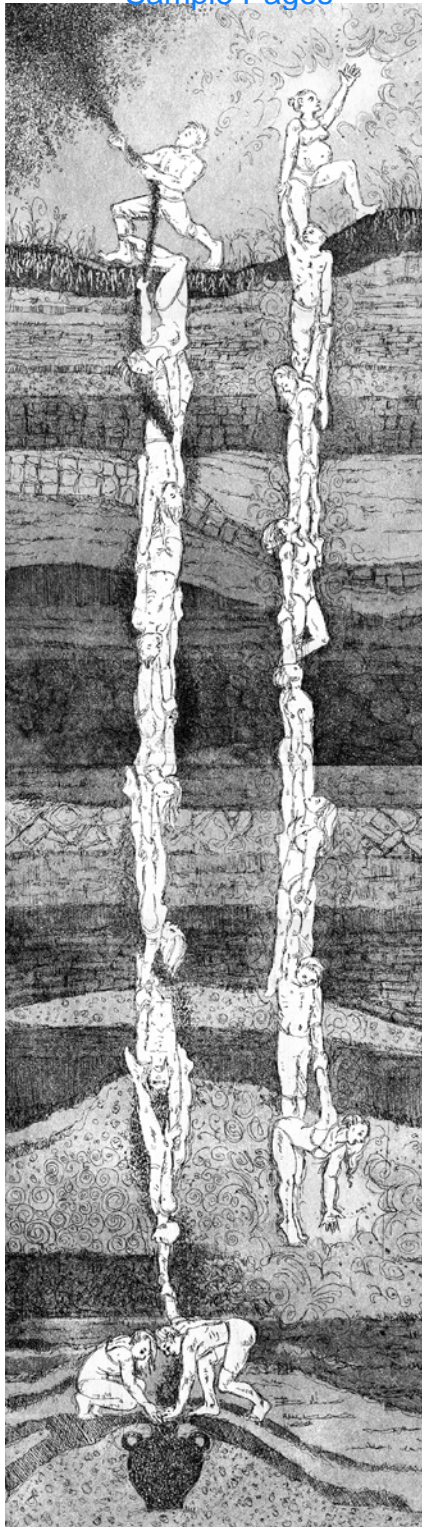
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People Pipeline, Sylvia Arthur. Etching.
Artist's statement is at the end of this chapter.

CHAPTER ONE

SOMETIMES YOU HAVE TO DIG...

Alice Major, Author

Sylvia Arthur, Artist

Hi, Sylvia!

I'm trying to think through our project. We've been charged with expressing hope—to look at the ways people are tackling climate change and making our shared art out of it. But I remember our first tentative conversation after you and I had started the research. “Do you feel hopeful?” you asked. And I had to say, “No, not really.” Climate change seems so huge, so amorphous. It's like punching a fog that would never notice our individual efforts. Honestly, I have moments of wanting to subside into my own tiny life, hoping the fog will just somehow blow away.

But then, after we started learning about carbon capture and geothermal energy, you said something like, “Maybe we should be looking underground.” Suddenly an image from old myth came to me—Pandora's box. It wasn't actually a box, originally. It was a pithos, a giant clay jar used for storing oil or wine. This particular pithos, given by the gods, had been stored with all the ills afflicting humanity, and when Pandora opened it, they all flew out—grief and sickness, anger and pain. But at the very bottom, there was hope, and it's still there.

Sometimes, when you need hope, you have to dig for it.

• • •

I like to think of all the layers beneath our feet—all the soils and sands and rocks that Earth has wrapped around her warm heart. Here in Alberta, we're standing on some of the oldest rocks on the planet—the North American craton—covered by layers of debris from mountain-building and sediments from a vast inland sea that sloshed in and out as the craton drifted slowly northward and land rose or sank again. Over millions of years, marine life, plants and ancient animals lived plentifully and died in the warm waters. Their carbon bodies were compressed under dust from new mountains that fractured the western horizon and then eroded again

Now we stand on this vast Western Canada Sedimentary Basin. Below us, layers interlock like fingers in a child's hand-stacking game: the Belly River formation ... Upper Mannville shale ... Wabamun muds ... the Leduc reef formation. A bewildering geological maze where those ancient life forms have metamorphosed into the coal, oil and gas we dig up to power our lives.

And where we begin to realize that what we have dug up is not the unqualified good we thought it was—that the carbon we have let out of the box and burned is heating up our planet's surface.

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Pandora's jar was meant to be a punishment. The gods had been angered by the theft of their fire by Prometheus, craftsman and creator of humans—including that first woman, Pandora herself. The story goes that she was dressed up in nice clothes and sent down to create havoc, along with that closed jar.

Sure, blame the woman. Pandora got her bad rap from the poet Hesiod, writing in the eighth century BCE. However, there are other versions of the story in which she isn't named as the idiot who opened that jar and let all hell loose on humankind. And some scholars suggest that she was originally a very different figure—an ancient mother-earth goddess—and that

her name means the giver (not the receiver) of all gifts. On a fifth-century amphora the half-figure of Pandora emerges from the ground, her arms upraised, as though she is the Earth.

It seems a bit strange to be dragging a myth from ancient Greece to a landscape where it doesn't belong. Pandora comes from the Western narratives that pervaded this realm and overlaid the spiritual understandings of the people who were here first. Indigenous Peoples can point to many other stories that grew here. They understand the world as a series of reciprocal, cyclical relationships with all life forms ("all my relations") rather than invention and control.

But I can't appropriate their stories. This is the one I was given. So, having brought this story here, maybe we should try to understand it. Pandora's myth is, at heart, a lesson in humility. We are very small, but small unintended actions can have huge consequences. We let things out that we can't easily put back.

• • •

Still, we can try. That's why it's inspiring to learn about carbon sequestration and the very real pipeline system that is tucking liquified carbon dioxide back into the rocks it came from—the formation that kept gas safely sealed away for millions of years. The Alberta Carbon Trunkline Project is collecting the CO₂ from various industrial processes—making fertilizer, processing bitumen, even brewing beer—and compressing it into a thick liquid. This is pumped through the pipeline to an old oil-field and then down 1800 metres into the geosphere. Through layers of Colorado shale ... through the Upper Nisku formation with its anhydrous salts ... through the shales and clays of the Ireton formation ... finally to fill the holes and channels in the Nisku limestone that sits below all this and is sealed off by the layers above it.

I do find this inspiring. Looking at the geology and the monitoring, I feel confident this will work. It will keep carbon

dioxide from reaching the atmosphere, 1.5 million tonnes of it every year when the pipeline is at full capacity. This is real.

But it's still only a teaspoon in a large lake. Unless we drastically reduce the amount of fossil fuel we're burning to energize our homes, vehicles, industries, we're not going to moderate climate change. However, even a world plated with solar panels and twirling with windmills won't be enough to deliver the energy needed by 10 billion people in 2050.

This summer has already been so dominated by the whiplash of drought and flood from Cornwall to China. Warming air soaking up ever more moisture, then squeezing it out in great torrents. Time is shortening. We need to look deeper.

• • •

Then I think again of where we're standing. Not just here in Alberta, but on the surface of a planet with energy at its heart. Not simply the sips and pools of long-gone life, but the enormous heat at Earth's centre.

This is the oldest warmth of all, primordial, from the time when material in the planetary disk around the newly formed sun was pulled together by gravity. Everything from atoms to asteroids was banging around, and the swirling kinetic energy was transformed to heat. Add to that the deep, ongoing, radioactive decay of elements like uranium. Far below our feet, a thick shell of molten rock forms the mantle that surrounds the planet's core. Worldwide, this geothermal energy percolates slowly to the surface—even below the Antarctic's ice caps, and certainly here below Alberta.

So I am inspired by another project that is tapping into that geothermal energy. There's a modest demonstration project near Rocky Mountain House that's creating a kind of radiator to bring heat to the surface. Most geothermal projects have been based on capturing the heat from underground water or brine, which requires very specific kinds of geology to work. But the demonstration project consists of a pair of 2.5-km-deep

boreholes connected at the bottom by a tunnel. A fluid circulates through this U-shaped path, harvesting heat from the rock itself and carrying it to a heat exchanger at the surface. The circulation doesn't need to be powered by pumps; it simply depends on the central fact that heat rises. The plant has been in operation since 2019, showing that the system does work and could be scaled up to commercial size, to heat buildings and power turbines. And it produces no CO₂!

I often feel like we're in one of those adventure movies where a car is racing against a train to reach a crossing in time. Could we implement a technology like this fast enough to make the difference we need in global levels of carbon dioxide? Then I think of how quickly technology can change things. The first automotive vehicles were cobbled together by inventors in the late 1890s. Within two decades they were common. Now we have to race against the automobile itself (and the planes and coal-fired generating stations) to make the fundamental changes we need in a very short time.

• • •

Back to Pandora's jar. The shape of the pithos reminds me of a womb, the primordial origin for all humans. The giant pottery jars were also used for death, to bury bones and bodies in Bronze Age Greece. Birth and death—that rhythm reminds me a little of warmth rising and falling in the geothermal loop. To me, it offers hope for a cycle that can be sustained.

• • •

Alice Major's 12th book of poetry, Knife on Snow, reflects on the ecology and history of western Canada and beyond. She is also the author of the essay collection, Intersecting Sets: A Poet Looks at Science. Alice served as first poet laureate of Edmonton and founder of the Edmonton Poetry Festival.

SOMETIMES YOU HAVE TO
DIG FOR HOPE

Alice Major

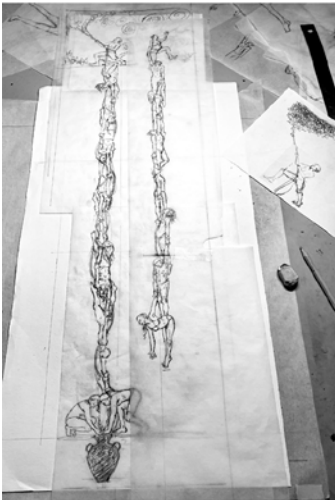
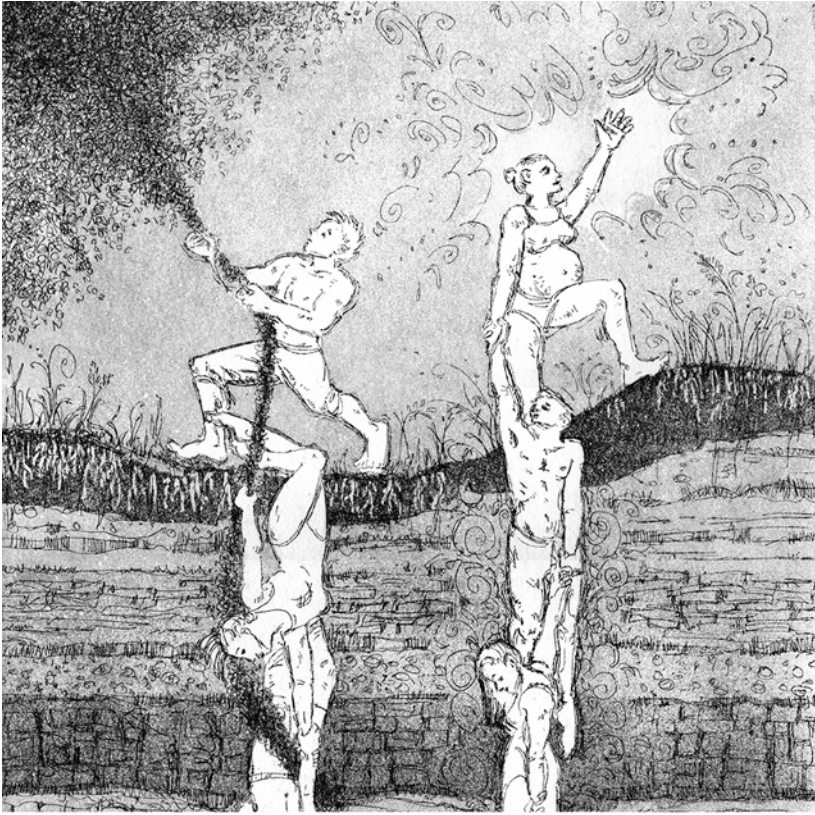
Here on the planet's crust, so close
to the desperate cold of space,
we looked for warmth and rummaged
in the chest of wonders
we'd been gifted. We learned to burn—
crackle and spark of wood, its cooling ash.

We let things out from underground.
They looked like hope
at first—coal's black gleam. The shine
of oil, its flair and freedoms. Only to find
we'd let loose ills and demons
in faint wisps of carbon gas that joined the air,
tipped it towards disaster.

Now we huddle together, try to tuck
some of that CO₂ away, back
into the planet's rocky chest,
like children trying to conceal the mess
they've made. It's hard to hope
that this will be enough.

Still, deep in the giant jar of Earth
is all the warmth we'd need, welling
upward from the planet's core,
its molten mantle. We could dig down
again, with careful fingers,
to let that heat creep up from rock
to spin our turbines and exchange
our feckless combustions
for steady energy, stored hope.

Sample Pages



People Pipeline art in process. Top: *People Pipeline* (detail), etching.
Bottom, left to right, Image design and inking the copper plate.
Sylvia Arthur.

PEOPLE PIPELINE

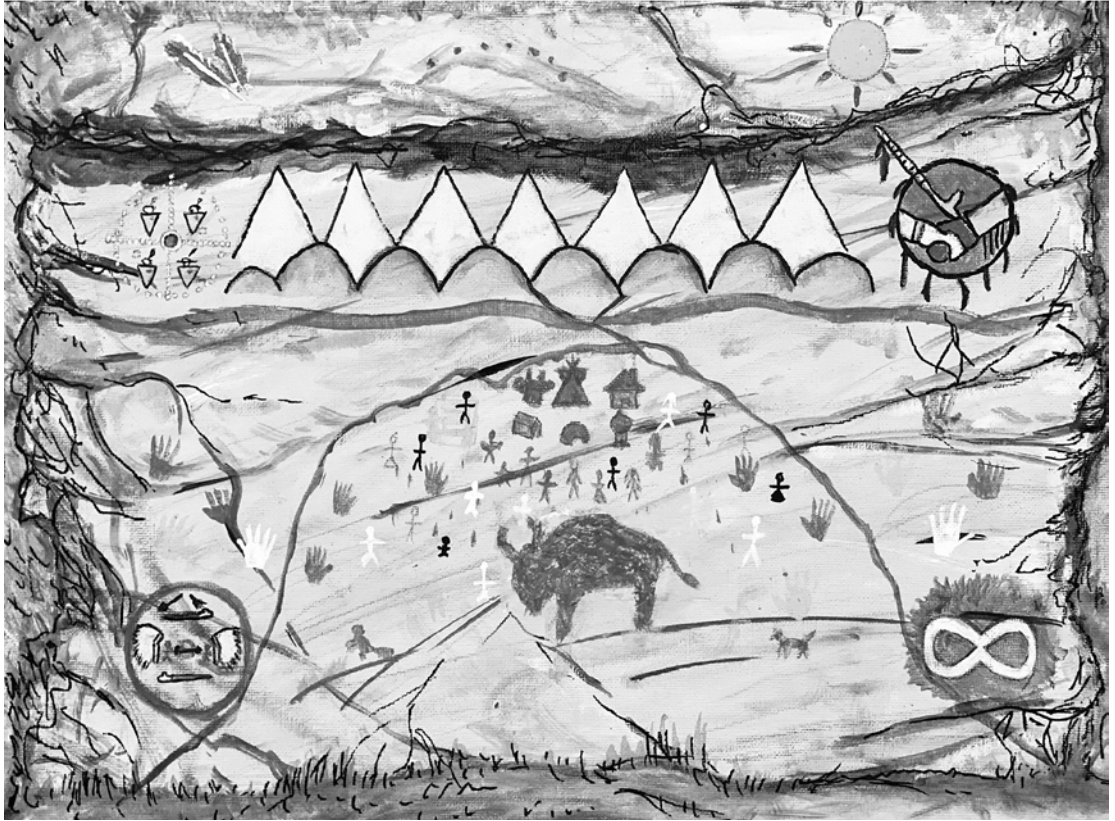
Etching on Kozuke paper, 2022, 33 x 96.5 cm.

Sylvia Arthur**STATEMENT**

It might be challenging to consider climate change without feeling overwhelmed and powerless, yet improvements in energy transition that provide hope for a brighter future are on the horizon. The visual component of this artistic collaboration tells a story that is inspired by recent technological developments in Geothermal Energy and Carbon Capture Sequestration (CCS). The etching is an imaginary cross-section of the earth's underground rock layers, showing how depleted oil and gas infrastructure and geological formations are being used to support new energy advancements. Linked human figures depict a pipeline of CO₂ being sequestered deep into the earth, while another chain of figures symbolically gathers Geothermal Energy from the earth's sub-terrestrial strata, bringing it up to the surface. The "People Pipeline" is a metaphor of humanity working together, hand in hand, to make positive changes for the future.

• • •

Sylvia Arthur is a graduate of the Visual Communications program at Alberta College of Art + Design (now Alberta University of the Arts) with extended studies in painting, drawing, and printmaking. Her work has a narrative aspect inspired by stories or poetry. She has designed exhibits (for example, Dinosaur Provincial Park) as well as public art in various Alberta locations. Other collaborative projects include the "Print(ed) Word," displayed at The Calgary Central Library.



Community, Jared Tailfeathers.

Acrylic on canvas reproduced as digital print on archival paper.

Artist's statement is at the end of this chapter.

CHAPTER TWO

CHALLENGING TIMES

*Larry Kapustka, Author
Jared Tailfeathers, Artist*

**AN ENERGY FUTURES
SESTINA**

Climate change and human population expansion
requires smart Innovation (iksimm)
if we are to achieve Resiliency (sskona'ta'pssi).
While there is much focus on energy technologies,
all would be wise to nurture culture's Power (Saaa'm)
as we search for sustainable Opportunities (waatoyinnayi),
because efficient energy, devoid of arts
makes a sterile Community (aaka'itapisko)
not worthy of the Change (isawa').
Physical and cultural landscapes have always
been subject to Change (isawa').
Humans have a gift enabling them to Innovate (iksimm),
to choose to be in harmony with the ways of nature,
to form vibrant Community (aaka'itapisko),
to be adaptable and respectful in striving
toward Resiliency (sskona'ta'pssi).
This is the challenge of our day,

to seize the Opportunity (waatoyinnayi)
to diversify varied forms of energy and
embrace emotional and cultural Powers (Saaa'm).
Fescue grasslands, for millennia, furnished Blackfoot
their source of solar Power (Saaa'm).
Decadal weather patterns modulated productivity
requiring vigilance of Change (isawa').
Observed phenology forecasts Opportunity (waatoyinnayi).
When old ways were not working,
it was necessary to Innovate (iksimm).
The wise, the observant, those with measured daring
became Resilient (sskona'ta'pssi).
From this, and by emulating wolf,
the Blackfoot developed Community (aaka'itapissko).
Nature has revealed models that are useful
for human forms of Community (aaka'itapissko)
that respect dynamics, that wisely nurture Power (Saaa'm),
that can foster cultural identity built for Resiliency (sskona'ta'pssi).
We can all learn from Indigenous Peoples
about how to adapt to Change (isawa'),
to incorporate new ways of thinking,
of using, of being, derived through Innovation (iksimm).
providing all peoples with great Opportunity,
Adapting to new economies creates Opportunity (waatoyinnayi).
Managing energy in forms of food is embedded
in Community (aaka'itapissko).
Success depends on Innovation (iksimm).
Sun, wind, and water again are the sources of Power (Saaa'm).
The ways of the buffalo (iinnii Bison bison)
and wolf can show the ways for Change (isawa'),
achieving for all peoples, Resiliency (sskona'ta'pssi).

Generational respect can teach us to be Resilient (sskona'ta'pssi)
and bring with it immense Opportunity (waatoyinnayi).
Embracing reconciliation demands transitional Change (isawa'),
reinstalling pride within Communities (aaka'itapissko)
and fostering unity of purpose for increasing Power (Saaa'm),
such that cultural integrity is strengthened
through Innovation (iksimm).
While seeking a new world order designed
to be Resilient (sskona'ta'pssi),
we will be required to engage and respect
our diverse Communities (aaka'itapissko).
This will necessitate uncommon courage
to embrace Opportunity (waatoyinnayi)
in ways that have seldom been done to harness
our enormous collective Power (Saaa'm).
There will be resistance and fear of Change (isawa')
as well as excitement that comes from
imagining new ways to achieve Innovations (iksimm).

• • •

We chose a specific poetic form known as a sestina as the vehicle for our message. A sestina consists of six lines per stanza and six stanzas. The lines are arranged in a specific pattern so that the last word rotates and will occupy all six positions. This poetic format originated in France in the 12th Century. Recently, Joy Harjo, Poet Laureate in the USA likened the structure to that of Navajo weavings. After producing the sestina, we elaborated each term to embrace the imperatives of reconciliation and explored the complex social-ecological systems inherent in energy transition.

Work on this piece began with the identification of six words we deemed central to the consideration of energy futures. In

selecting the six words, we sought to reflect on traditional knowledge of Indigenous Peoples of what is now southern Alberta that could guide the transition that is before us. The words we chose (and the Blackfoot equivalent) were Power (Saaa'm), Change (isawa'), Opportunity (waatoyinnayi), Innovate (iksimm), Resilient (sskona'ta'pssi), and Community (aaka'itapissko).

I. Power (Saaa'm)

Power comes in many forms in our biophysical world. Unharnessed power comes in the form of storms, floods, fires, earthquakes, and volcanoes. These phenomena engender awe, perhaps differently in the past than today as we have learned something about these forces of nature through science.

Prior to the industrial revolution of the 18th and 19th centuries, power used by humans was limited mostly to brawn and domesticated animals harnessed to do work. That changed with the development of machines. Arguably the most substantive change resulting from machines was the attitude within non-indigenous societies that humans could live apart from the forces of nature, that humans wielded control over all things. Such arrogance has led to destructive practices that present danger to human societies across the globe and threaten multiple assemblages of plants and animals with extinction.

The industrial revolution spawned many developments, not the least being scientific discoveries in public health. Implementing policies and practices has resulted in longer life expectancy due to fewer infant and early childhood deaths. While death rates declined, birth rates remained the same resulting in a burgeoning human population globally. The expanding population spread geographically, usually to the detriment of Indigenous Peoples.

The effects of colonization are profound. In the prairies of North America, Indigenous Peoples lived in a solar-powered system. The bison have been described as the “batteries” that stored the sun’s energy in the form of food and fibre transported across the prairies and harvested for human use. For several millennia

the ebb and flow of plant and animal productivity governed the fortunes of the tribal communities. Coincident with colonization, the wanton slaughter of bison upended the lifestyle of these Indigenous Peoples. Disease and perverse attitudes, including the Doctrine of Discovery, resulted in genocidal actions that decimated populations of Indigenous Peoples. With that, much of the experiential knowledge of living within the means of the natural systems was lost. Only now are we collectively learning the price of losing that knowledge.

Ecosystems provide food and fibre for humans. There is richness in the diversity of plants and animals that adapt and evolve in response to each other and the prevailing climate. Indigenous Peoples respect the diversity and recognize the healing power of different plants. Some plants are used in ceremony, some are observed as harbingers of seasons. All these forms of power, or medicines (Saaa'm), informed the way of life on the prairies.

As we lurch toward the middle of the 21st century, power occurs both as control exercised over others or a type of energy. The primary sources of energy that drove the industrial revolution were fossil fuels (coal, petroleum, natural gas), which have brought on the forces of climate change resulting in destabilizing weather and ecological systems. The realization that human societies are in jeopardy is triggering development of new sources of energy (solar, wind, geothermal, nuclear). But these are being approached in many cases as singular, engineering solutions. We would be wise to focus on the interconnectedness of our complex social-ecological systems and adopt holistic approaches that consider power in the broadest sense.

2. Change (isawa')

Social-ecological systems change over time. Nothing is constant. Economic structures, whether based on barter or agreed value of some currency are challenged if change occurs rapidly or sporadically. During the days when hunter-gatherer societies were prominent, bands experienced periods of abundance and episodes of

crippling shortages caused by droughts, floods, or other calamities.

Historical events with global consequences include volcanic eruptions such as Mounts Mazama, Vesuvius, and Krakatoa. Injection of ash into the upper atmosphere reduced the intensity of solar radiation reaching Earth's surface resulting in several years of cooler temperatures. We know from archaeological evidence exposed at Head-Smashed-in Buffalo Jump, a UNESCO site in southern Alberta, that there was a gap of a millennium or more in usage of the site as a buffalo jump, possibly due to a shift in migration routes of the bison.

Modern societies also are subject to social-ecological disruptions. In addition to the ebbs and flows of climate, contemporary economies face additional stresses that disrupt the flow of goods and services, along the global supply chain. Our contemporary "poster child" for such disruption is the Covid-19 pandemic that exposed deficiencies in food, water, and energy distribution systems. The Russian invasion of Ukraine has blocked transport of grains to Africa and other regions and threatens widespread famine.

And, we are currently experiencing disruptions from human-induced climate change. Crop failures due to heat, drought, fires, floods, and outbreaks of diseases jeopardize food security in many regions. The pace of change poses challenges that are playing out on global scales unlike any that humans have experienced previously.

Consensus is that combustion of fossil fuels (coal, petroleum, natural gas) is responsible for the rise in atmospheric carbon dioxide. This, plus releases of methane, constitute the two most potent greenhouse gases that lead to atmospheric warming and acidification and warming of oceans. These factors are linked to disrupted weather patterns including increased frequency and intensity of severe events. The abruptness of the shifting weather patterns places stress on food production at all levels from home gardening to intensive agriculture.

Consequently, human societies can expect unprecedented

change in how we generate and use energy. Competing economic and political factions are already engaged in vigorous policy debates regarding the urgency of the moment and the appropriate pace of transition—the intensity of the debate will likely increase.

3. Opportunity (waatoyinnayi)

Crises, though difficult to experience, can signal opportunities. When the bison changed migration patterns, presumably in response to shifts in weather that affected habitat quality, Indigenous Peoples altered their hunting strategies. Throughout history, challenges have been visited on all societies. The current climate crisis provides opportunities for our time. It is a time for reflection, re-examination, exploration, and action.

During the past 400 years, industrial societies became reliant on fossil fuels; for the last 100 years petroleum has supplied most of our energy. Penetration of railroads across North America, powered in large part by coal, was linked to the demise of the massive bison herds that roamed the plains.

Reliance on fossil fuels has resulted in highly mechanized, industrialized agriculture that uses petroleum to fuel and lubricate behemoth machines, provide fertilizers and pesticides, pump surface and fossil water to crops, and long-distance transport of crops to markets. It has also promoted private transportation in lieu of public transit, especially in North America. The backbone of the petroleum industry is composed of heavily subsidized multinational corporations and disproportionate leverage over government policies.

Warnings about the causal relationship between fossil fuels and climate change started two centuries ago. Physicists and climatologists became more vocal about these threats more than 40 years ago. Today, there is widespread agreement that human-induced climate change is due largely to the consumption of fossil fuels. Other human behaviours such as deforestation and other land use practices contribute to the crisis as well.

Globally, societies are seeing the threat of climate change as a catalyst to change, as an invitation to explore new opportunities in how we harness and use energy. Opportunities exist across the spectrum of policy, technology, and behaviour. Whether we succeed or not will be measured in how we evaluate opportunities that embrace comprehensive innovation and what actions we take.

4. Innovate (iksimm)

There are three components that determine the success of innovation. Namely, policy, technology, and behaviour.

Policy: Communities and nations can set policies that can have profound effects on energy choices and usage. At the highest levels of government, innovation can be built into tax structures as well as subsidies and stimulus packages to industrial sectors. Municipalities can enact bylaws affecting building codes, or restrictions on energy types. Requirements for building public facilities to Platinum LEED standards are being implemented. Zoning restrictions, including limiting urban sprawl to protect quality agricultural lands, can be highly effective.

Corporations have a substantive role to play in setting internal policies aimed at lowering energy consumption. Setting near-term and long-term targets for reducing carbon footprints is becoming commonplace. Industry and professional associations can play a significant role toward innovation.

One of the most significant challenges to policy change that encourages innovation is centred on equitable access. Historically, the benefits from advances in technology tend to go to the most affluent, further widening the gap between the haves and the barely-haves. Remote rural communities, including most Indigenous populations, must be afforded access to and reap the benefits of innovations and be innovators themselves. That is a responsibility of government and of corporations as they strive to obtain and retain their social licence to operate.

Technology: The past decade has seen great advances in energy technology. Some of the advance comes from improvements in older technologies made feasible through economies of scale. This is perhaps most pronounced in three forms of renewable energy: solar, wind, and geothermal. In each of these sectors, prices have continued to come down to levels that are below the costs of energy production for petroleum and natural gas.

Opportunities for innovation exist in the placement of infrastructure and in decentralizing the generation and distribution of electricity. Microgenerators, primarily solar panel installation on homes and businesses, can play a major role in diversifying energy production. And they have value in urban and rural settings.

Battery technology is advancing rapidly, including rapid recharging stations. Areas ripe for innovation include extending the life of batteries, minimizing end-of-life wastes, and reducing the footprint related to accessing lithium. A promising development in Alberta is the extraction of lithium from abandoned oil wells.

Behaviour: The third prong of innovation may be the most important in our quest to combat climate change. Jevons Paradox, named after the British economist William Stanley Jevons, advanced in 1865, states that as steam boilers became more efficient, the total consumption of coal would increase. An update of this concept by Joseph Tainter in 2008 concluded that Jevons Paradox is applicable across the board. For example, increased fuel efficiency in automobiles led to greater total consumption of gasoline. Relieved of the guilt of driving a gas guzzler, people are prone to take more and longer trips. Or those who previously could not afford to own a personal car determined they could with the greater fuel economy. Economists refer to this as a “rebound effect.”

If individually or collectively we fail to lower wasteful use, and instead generate more electricity, get more electrical gadgets, and drive our electric vehicles greater distances, we risk the reversal of all the gains we worked so hard to attain.

5. Resilient (sskona'ta'pssi)

All extant life is testament to an innate drive for survival. Through some combination of fitness and chance, every living creature is the product of resiliency. Yet, due to the profound, oversized influence humans have exerted, Mother Earth is experiencing the 6th wave of mass extinctions. The forces, the power, the dominance of humans is stretching the coping capacity of plants and animals. We do not know what the break point is for human societies. We have a sacred obligation to act in ways that safeguard not only human society, but importantly our fellow travelers. Might we be more likely to nurture resiliency if we adopted the perspective of Indigenous Peoples as they refer to the “plant people” and the “animal people?”

We understand from western science that resiliency is an attribute of complex ecological systems. Unfortunately, we do not yet know which parts of these systems are needed to keep them functioning. So, as we combat climate change by shifting toward renewable energy, we need to be aware of relationships within the social-ecological systems and be humble about what we do not know and may never know. Amidst all the disruptive forces operating today geopolitically and economically, society is engaging in several grand experiments to transition away from dependence on fossil fuels. We seem to be operating under the tacit assumption that if we shift entirely to renewable forms of energy that we will save society.

But that is a dangerous assumption. Unless a holistic transformation occurs, we are not likely to maintain resiliency. We need much more than an engineering solution. We need to nurture a shift in perspectives that recognizes the interconnectedness within complex social-ecological systems. That requires changes in attitudes toward nature, changes in behaviours, openness to diversity in all forms. Only then will we be poised to maintain resilient societies.

6. Community (aaka'itapissko)

Social-ecological systems are composed of communities of individuals having common interests, common aspirations, and common heritage. We know from ecological studies that the structure of any community is the result of its past and it is dynamic; there is a memory of the past that determines the trajectory of the community as it develops. Although Indigenous Peoples model their culture in part on the circle, that should not be interpreted as returning to the past, but rather having awareness of the past. Current conditions are different and can never be recreated to be exactly as they once were. Yet, the idea of cycles, whether seasonal or generational, has utility in understanding who we are and where we might be headed. We ought not expect a return to the time when bison roamed freely across the plains in great numbers. But that should not deter us from re-establishing enclaves with viable bison herds and re-introducing wolves and beaver and other culturally important species if for no other reason than to be touchstones to the past. To not do so would be to deny future generations the opportunity to experience at least some segment of their heritage.

The quest for renewable energy requires more than technological breakthroughs. There needs to be strong connections to social systems as well. And increasingly we understand what many Indigenous Peoples knew for millennia: the welfare of humans is bound inextricably to our ecological surroundings. Humans are not above nor below other components of the ecological system. They are equals.

That perspective of being embedded in and not apart from nature informed the development of Indigenous human community and is understood to have been critical to survival. Wolf, for instance, played a foundational role in the organization and function of the Blackfoot community. After observing wolf packs, how they behaved, how they hunted, the Blackfoot learned how to survive in the harsh conditions of the high plains of what is now western Alberta.

WOLF: MY SISTER, MY BROTHER**SESTINA**

Larry Kapustka

in collaboration with Jared Tailfeathers

A mighty creature roams wild expanses with its pack,
all powerful.

Bellies full of mother's milk and meat scraps,
pups bound playfully.

Light of a full moon dancing through forest branches
evokes a howling lament.

Surely, this eerie penetrating cacophony fuels fears of
this awesome beast that is so misunderstood.

First light on a frigid October morn,
illuminates silvery hackles of a male, so enchanting.

Its place among companion animals and plants,
prey and sustenance, is that of a keystone species.

Natural assemblages are what they are due
to the influence of keystone species.

Although individually strong, as a pack the wolf
is especially powerful.

Standing on the crest of a prairie hillock the
alpha male truly is enchanting.

Self awareness of strength and hierarchical position
allows the pack to be playful.

As the wolf's behavior is largely peaceful,
its place among us is grossly misunderstood.

Sensing this, is the
night-song of wolf a lament?

Or is it humans who should express lament?
For so dishonouring the role of this keystone species.

For fashioning outlandish myths
that demonstrate how maddingly
wolf is misunderstood?

This despite lessons we could learn
from brother wolf that are so powerful.

Lessons that we could learn how to relax
when our needs have been met and be playful.
Were we to adopt the teachings from sister wolf,
might we become equally special/enchanting?

The goal should not be to claim dominance,
but to earn respect for being special;
To live our lives with honour and respect so that
we have little to lament;
To create space for leisure, to enjoy all that is around us,
and to be playful;
To adopt the manner of a keystone species;
To achieve a balance of kindness and
sharing commensurate with being powerful.
In these ways, we can reduce
the chances of being misunderstood.

Efforts to learn from plant and animal people
are often misunderstood.
But of the straight trunk of lodgepole pine,
what could be more enchanting.
The ways of learning from wolf people are powerful.

When these cohabitants of ours are diminished,
there is much to lament.
The regulatory strength of brother wolf underscores
its role as a keystone species.
Yet we see that even with their power and elegance,
they teach us to be playful.

Hubris denies us of our ability to be playful.
Our role in the complex ecological system
is so often misunderstood.
Destruction of landscapes is more aligned
with virulent parasites than of keystone species.
Pomposity is honoured above the humility of
simply being special.
For this we truly have much to lament.
Human drive for dominion over the lands is destructive,
a false sense of being powerful.

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In the spirit of reconciliation, we owe each other the respect of learning about the diverse cultures, the varied communities across this landscape. Perhaps the most important lesson we can learn, and embrace is that to have a livable environment, we need to live within our means. We need to understand that economies are one aspect of viable society; that societies, composed of communities, are embedded within and wholly dependent on the flow of goods and services from ecological systems.

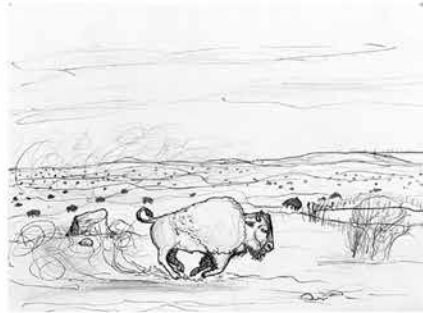
The viability of the communities at minimum is determined by the quality of the ecological system measured in terms of access to food, fibre, and clean water. But humans require more. There must be access to sacred sites as governed by cultural norms and to recreational opportunities. While we

reimagine ways to generate energy, we owe our future generations a platform that enhances their quality of life in the form that enables continued innovation to build resilient, diverse, respectful communities.

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Larry Kapustka is an emeritus senior ecologist. He marvels at the intricacies of social-ecological systems and understands that we must be humble about what we think we know. His work has allowed extensive travel across North America, Europe, as well as portions of Africa and Asia Pacific. In retirement, he lives on an acreage with his wife Susan Kristoferson, an artist, where he raises chickens, and enjoys hunting and fishing. Larry was a founding member of the Foothills Energy Coop as well as the Diamond Valley Sustainable Living Centre for which he serves as chair.

Sample Pages



Counterclockwise from top:
Power, Change, Innovate, Resilient, Opportunity, Jared Tailfeathers.
Pencil and marker and acrylic on canvas.

COMMUNITY (aaka'itapissko) **AND INNOVATE** (iksimm)
Acrylic paint on canvas, 2022, 27.9 x 35.56 cm.

POWER (Saaa'm), **CHANGE** (isawa'), **OPPORTUNITY**
(waatoyinnayi), **RESILIENT** (sskona'ta'pssi)
Pencil and marker on paper, 2022, 21.6 cm x 27.9 cm.

Jared Tailfeathers

STATEMENT

Indigenous Peoples have been close to nature since time immemorial. Physical landmarks, as well as the plants and animals that live on these lands, are woven throughout the culture of Indigenous Peoples. Misuse and even destruction of these parts of our land in effect are destructive to ourselves and our way of life. Learning from the ways animals interact became the foundation of Indigenous Culture, one that resulted in a small carbon footprint. In particular, wolf informed the Blackfoot on ways to hunt as a group and is reflected in our origin stories. Similarly, the Buffalo or Bison is the most important animal in all the Plains cultures; losing them is how we lost ourselves, our language, culture, and land. The disappearance of these two keystone animals changed history and the land. The Blackfoot and other Indigenous Peoples view the return of these animals and their connection to Indigenous cultures to have major importance toward living in harmony and within the means provided by these lands.

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Jared Tailfeathers is a multidisciplinary, bi-racial Blackfoot (Kainai) artist, musician, inventor, workshop facilitator/teacher, amateur Historian/researcher, and author. He builds original musical instruments for interactive projects, performances, workshops, recording, and for sale. He works in various styles, media, genres, and materials depending on the project or commission.